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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Cyril Henry Putnam Brookes  
Serial No.: 10/782,312  
Filed: February 19, 2004  
Title: BUSINESS INTELLIGENCE SYSTEM AND METHOD  
Docket No.: 36461

LETTER

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Enclosed is a certified copy of Australian Patent Application No. 2003900776; the priority of which has been claimed in the above-identified application.

Respectfully submitted,

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Date: 5-13-04

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

John P. Murtaugh

Name of Attorney for Applicant(s)

May 13, 2004 John P. Murtaugh  
Date Signature of Attorney



**Patent Office  
Canberra**

I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003900776 for a patent by EIS PATHFINDER PTY LTD as filed on 20 February 2003.



WITNESS my hand this  
Twenty-fourth day of February 2004

A handwritten signature in cursive script that reads "J. Billingsley".

**JULIE BILLINGSLEY  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES**

**AUSTRALIA**

PATENTS ACT 1990

**PROVISIONAL SPECIFICATION**

***FOR THE INVENTION ENTITLED:-***

**"EXECUTIVE INFORMATION REPORTING SYSTEM AND METHOD"**

The invention is described in the following statement:-

## FIELD OF THE INVENTION

The presenting invention relates to the field of information management reporting systems and, in particular, discloses a system for the specification of executive information reporting requirements in a corporate environment.

5

## BACKGROUND OF THE INVENTION

Traditionally, the (EIS) Executive Information Systems software market originated with products released progressively from 1975 onwards. The first such products were financial planning based. Spreadsheets became very popular from the 1980s and these applications made the provision of both raw data and processed information more  
10 available. Transactions processing systems, for applications such as inventory management, order processing, costing, etc. became widely available in corporations, creating new databases as a by-product. Systems to report from the new data resources then made their first appearance. IBM's Structured Query Language (SQL) and Query by Example (QBE) retrieval packages were new approaches to retrieval.

15 Comshare's Commander EIS and Pilot Software's Lightship were two of the first applications specifically oriented to the EIS market, merging the capabilities of data access, data manipulation, report preparation and query processing.

By 1990 a large market for financial database applications had evolved, e.g. Oracle that included general purpose General Ledger systems. At about the same time  
20 Enterprise Resource Planning (ERP) packages such as SAP and Peoplesoft became a dominant force in corporate computing. ERP systems create a huge data repository which, when added to that available from other financial and transaction applications, required a new approach to information access procedures.

From 1990s technology of modelling and data mining developed at a high rate. Systems capable of analysing huge databases, such as those created by ERP packages were developed. Financial modelling to forecast cash flow and quantify "what-if" analyses were perfected. Statistical analysis packages from SAS and SPSS became  
5 widely used for intelligent data retrieval and analysis.

The Internet and the merging of the importance of text data with numeric data has recently spawned the growth of the Corporate Portal, offering the same service for the corporation as Yahoo! does for the personal users of the web. These developments created new types of executive and management reporting, now often described under  
10 the generic terms Knowledge Management or Business Intelligence systems as well as the term EIS used in this invention description.

All these developments greatly increased the reporting and retrieval capabilities, so much so that the ability to specify what executives wanted, or needed, out of all the available data became hard to specify. Indeed, executives are today often faced with an  
15 overload of information that actually reduces their overall productivity.

The accumulation of new demands and opportunities has led to rapid growth of the Knowledge Management (KM) and Business Intelligence (BI) sectors of the IT software market.

It is apparent from the above discussion that there is already a large number of EIS  
20 (including KM and BI) applications. Further, the high volumes of sales of Query/Retrieval/Reporting software means that many such systems are being implemented now and even larger numbers will be planned in the future. All these systems often involve the application of software tools to a variety of databases using different display formats, statistical calculations and retrieval technology.

25 It is axiomatic to state that:

*Before implementation of any information access and reporting system, the data/information to be displayed, its format and the frequency of reporting must be specified by the executive(s) who will use the system.*

However this specification task is both difficult and usually poorly executed. The highly regarded text book "Building Executive Information Systems" by Watson, Houdeshel and Rainer, summarises this situation as:

*Because executives perform highly unstructured work, it is difficult to identify their information requirements.*

*What information to include in an EIS is critical. If the users do not find the system's contents to be helpful in performing their job responsibilities, they have no reason to use it. The challenge is in finding what information to include. Getting executives to specify what information they want is the primary worry of EIS developers.*

The different approaches adopted by EIS developers can be summarised in the Table below. Some techniques are duplicated if they can be adopted in more than one way.

	Non-Computer Related	Computer Related
<b>Direct Executive Interaction</b>	<ul style="list-style-type: none"><li>● Discussions with executives</li><li>● EIS planning meetings</li><li>● Volunteered Information</li><li>● Examinations of non-computer generated information</li><li>● Critical success factor sessions</li><li>● Participation in strategic planning sessions</li><li>● Strategic business objectives method</li></ul>	<ul style="list-style-type: none"><li>● Examinations of computer generated information</li><li>● Examinations of other organizations' EIS</li></ul>

	<ul style="list-style-type: none"><li>● Tracking executive activity</li></ul>	
Indirect Executive Interaction	<ul style="list-style-type: none"><li>● EIS planning meetings</li><li>● Discussions with support personnel</li><li>● Examinations of non-computer generated information</li><li>● Attendance at meetings</li><li>● Examination of the strategic plan</li><li>● Tracking executive activity</li></ul>	<ul style="list-style-type: none"><li>● Examinations of computer generated information</li><li>● Examinations of other organizations' EIS</li><li>● Software tracking of EIS usage</li></ul>

The "Discussion with Executives" approach is critical to the system's success.

However, it is not simple to apply. From the aforementioned text:

5 *Simply asking the executive what information is wanted rarely results in a comprehensive description of information needs. Answers will be influenced by what information the executive has seen recently, the contents of existing reports, current problems and the executives limited understanding of what can be done with information technology.*

10 *Some analysts are able to get little or no time, while others have good access to the firm's executives.....noting that the amount of time an analyst gets is often related to how well the analyst knows the business.*

One of the most widely practiced approaches to the implementation of EIS systems is the Balanced Scorecard developed by Kaplan and Norton. Their concept focuses on ensuring that executives and EIS designers adopt a "balanced" approach to the implementation of systems. They state that executive reporting systems should have four reporting component perspectives Robert Kaplan and David Norton. The Balanced Scorecard – Measures that Drive Performance. HBR Jan-Feb 1992:

➤ Customer



- Internal business
- Innovation and learning
- Financial

The various approaches listed in the earlier table are all operationally possible.

5 However, they suffer from the following deficiencies. Specifically, they:

- Overlap, and the resultant specifications require substantial culling, to remove duplicate items
- Require skilled, experienced, consultants
- Do not easily allow for the experience in earlier projects to be  
10 communicated or used by executives and consultants in later ones
- Contain a mix of information required for "routine" regular reporting with that needed to solve problems that rarely arise – requiring further analyses/interviews
- Are often confusing and frustrating for executives, who see them as  
15 inefficient and unproductive

Although the four information reporting perspective categories of Kaplan and Norton are useful in defining segments of an EIS requirements study, they remain broad concepts. The analysis techniques required to determine specific measures required by executives are still the same as described in Table 1. This process is described in a later  
20 paper by Kaplan and Norton Kaplan and David Norton. Putting the Balanced Scorecard to Work. HBR Sep-Oct 1993 p 128.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide for an improved Executive Information Reporting System through a more accurate and complete system requirements specification.

5 In accordance with a first aspect of the present invention, there is provided an executive information requirements specification system for utilisation in conjunction with the operations of an organisation, the system including: at least one of four independent interactive modules for interrogation of, or self-analysis by, an executive, each of the modules eliciting and storing information requirements relevant to the  
10 organisation, the modules including: (a) a first module eliciting and storing information requirements related to the operational status of the organisation; (b) a second module eliciting and storing information requirements about the relevant acceptability of the operational status of the organisation; (c) a third module eliciting and storing information requirements derived from forecasting and exception analysis models of the  
15 organisation; and (d) a fourth module eliciting and storing information and model requirements likely to be required should a problem be identified with the organisation.

Each of the modules preferably can include a number of sub-modules eliciting and storing information requirements relevant to the module for interaction by a user. The first module preferably can include a series of submodules directed to at least one of  
20 organisation key performance indicators and customer feedback. The second module preferably can include a series of submodules directed to at least one of many possible benchmarks that the organisation has sought to achieve, relative performance measurements and market feedback. The third module preferably can include a series of submodules directed to significant changes in at least one of trends established in  
25 operational key time series, the validity of model assumptions made in forecasting and

unexpected events in the marketplace. The fourth module preferably can include a series of submodules directed to at least one of tools allowing for fast diagnosis of problems and to ensuring data availability for answering anticipated questions.

The system can be implemented via an internet browser environment.

- 5 In accordance with a further aspect of the present invention, there is provided a method of providing executive information in a useable form the method comprising the step of providing an interactive computer based system including a series of interactive modules , the modules including: (a) a first module eliciting and storing information requirements related to a operational status of the organisation; (b) a second module
- 10 eliciting and storing information requirements about the relevant acceptability of the operational status of the organisation; (c) a third module eliciting and storing information requirements derived from forecasting and exception analysis models of the organisation; and (d) a fourth module eliciting and storing information and model requirements likely to be required should a problem be identified with the organisation.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings in which:

Fig. 1 illustrates an initial flow chart of the operation of the preferred embodiment;

Fig. 2 illustrates a flow chart of the operation of a typical channel;

20 Fig. 3 illustrates a flow chart of the module reporting operation;

Fig. 4 illustrates a flow chart of the administrative functions of the preferred embodiment.

## DESCRIPTION OF PREFERRED AND OTHER EMBODIMENTS

The preferred embodiment, hereinafter referred to as "EIS Pathfinder" implements an information Query/Retrieval/Reporting system design specification methodology.

The methodology also relates to the specification of Knowledge Management and

5 Business Intelligence reporting systems. It is designed to be used by IT consultants who act as facilitators to executives in the initial phase of an EIS, KM or BI system. It assists in this process by:

- Providing a structured approach to the requirements specification task,
- Building confidence in both the client executive and the facilitator that  
10 the process is productive and is focused on the relevant industry or business context
- Automatically compiling a specification report that covers the complete decision making process

The specification report can be used by consultant to build the enhanced EIS  
15 system as chosen by the executive(s).

Key features of the Pathfinder approach to EIS specification include:

- Using a specially constructed (for the appropriate industry) EIS measure set, comprising potentially useful data reporting suggestions for the resultant system that are relevant
- 20 ➤ Offering examples of reporting similar to the suggested measures, so the executive is able to assess the benefit, or otherwise, of receiving such reports
- Providing the opportunity to re-examine any aspect of the specification task, automatically updating the Pathfinder report

The Pathfinder methodology is customised for each industry that is addressed by  
25 its client executives and facilitators. The customisation is achieved by adapting the

suggested EIS measures (or the questions) proposed to the executive as the requirements specification process evolves.

In the preferred embodiment, the foregoing principles are implemented by providing an Internet browser based system for providing executive information management. The application architecture is N-Tier comprising a Data Tier, Business  
5 Logic Tier and a Presentation Tier. The preferred embodiment utilises IIS/ASP.NET/MSSQL software. An alternative using J2EE and other web server and database software would achieve the same result. This allows for continued extendibility and customisation of operations.

10 The software design of the system is illustrated by the flowchart 1 of Fig. 1 wherein a user logs into the system 2 and is verified 3. Upon a successful login, a series of existing projects for selection are presented to the user 4. Various updating facilities are available for each project. These include the ability to create 5 and delete 6 projects. Also provided is the facility to view reports in respect of projects 7. The facility to  
15 select a specific project is also provided 9.

For each project, four separate interactive modules are provided including modules 10, 11, 12, 13. Each of the modules 10-13 includes a further series of channels. For example, the module 10 includes channels 20-22. Other channels e.g. 23 can be added in accordance with requirements.

20 Further, module 11 includes channels 30-33. The module 12 includes channel 36-39 and the module 13 includes the channels 41-44. Each of the modules provides for a series of interactions with the executive utilising the system. The Executive is instructed to interact with each of the modules in turn.

A major benefit of EIS Pathfinder is that it proposes a set of *small* questions for  
25 consideration by the executive and facilitator that are substantially independent of one

another. As a result, the Pathfinder EIS specification contains requests for information and data analysis that are cumulative. Therefore, the answer to the *big* question "*What information do you want?*" is the logical sum of the answers to the independent *smaller* questions.

5        The decomposition process for the *big* question involves a number of levels, each one involving narrower concepts than its parent. The first level is implemented by the modules 10-13. The overall EIS specification is seen to be the sum of four independent modules:

- Where are we? (10)
- 10        ➤ What is good and bad about where we are? (11)
- What is unusual and what is forecast? (12)
- What resources do we need to help solve problems fast? (13)

Each of these specification modules e.g. 10 has a number of support channels associated with it e.g. 20-23. Each support channel contains a set of suggested EIS  
15        measures. Each measure is a data item that may be a valuable information resource for the executive.

The support channels also contain examples of typical reports and formats (appropriate for the relevant industry) that assist the executive and facilitator in determining the value of each suggestion.

20        *Module 1: "Where are we?" (10)*

"Where are we?" is the first module offered by Pathfinder. It's objectives for the executive can be summarized as ensuring a satisfactory answer to the following:

- What are the Key Indicators saying about our finances, industry, customers, operations and corporate health? (20)

- Am I comfortable the selected Key Indicators tell me what I need to know to make good decisions? (21)
- What are people saying about our products, our service, our company, our industry? (22)

5    *Module 2: "What is good and bad with where we are?" (11)*

This second module of the EIS specification focuses on supporting the assessment of the status information that is delivered from the "Where are we?" reports. The reporting from this analysis will be pre-formatted, and usually periodic, but may be on-demand. It aims to give satisfactory answers to the questions:

- 10            ➤ What benchmarks/goals have we met or missed? (30)
- Is our performance on or over budget, how does it compare with last year or to best practice? (31)
- What is the grapevine saying on our performance? (32)

*Module 3: "What is unusual and what is forecast?" (12)*

15            The capability of modern EIS extends well beyond the reporting of data and information. Determining likely future values of Key Indicators is now a regular feature of periodic reporting and ad-hoc queries. Similarly, the analysis of detailed databases, seeking trends and unusual changes in behaviour, etc. is now relatively simple, given the right tools. This module therefore gives answers to:

- 20            ➤ What good/bad trends are just established in customer satisfaction, order receipts, etc? (36)
- Are the cash flow forecasting, and other, model assumptions still valid? (37)

- Have any new unexpected events occurred, e.g. a supplier has major trade union problems? (38)

*Module 4: "What resources do we need to help solve problems fast? (13)*

One of the critical distinctions that needs to be made in building an EIS

- 5 specification is to separate the information needed for routine purposes, the "dashboard" of Key Indicators (say), and that information required to solve problems that do not yet exist. The first three modules of Pathfinder (10-12) are directed at establishing the status quo, and to determine if any problems exist that need a response. The fourth module is intended to support rapid information access and retrieval when a problem is identified
- 10 and action may be required.

Of course, only a few potential problem situations can be forecast. Often, however, it is desirable to have the query, reporting and forecasting model capabilities ready – to expedite solution. The module is directed to answering the following:

- Fast diagnosis/solution of problems needs ad-hoc customized tools for drill-down (41)
  - But which ones? And what about data availability? (42)
  - What advance planning for common problems is desirable? (43)
- 15

As noted previously, each module of Pathfinder has a further level of decomposition below it which present to the executive and facilitator a set of EIS

20 measures for consideration and possible inclusion in the Pathfinder specification report. Examples of sample reports are able to be associated with one or several measures.

The channel content can be specific to a particular industry and customised on an ongoing basis. A generic channel set is used as the basis for all the individual industry channel EIS measure sets. The channels for each measure are shown in the Table below.



Where are we?	What is good and bad with where we are?	What is unusual and what is forecast	What resources do we need to help solve problems fast?
Key Indicator Summaries - Telling you about the important numbers	Performance against Benchmarks - relating the status to "par", or earlier achievements	Forecasting Models - Presenting future estimates with comparison against benchmarks	Diagnosing the Situation - Finding the right data resources, "drilling-down", finding any related situations and data
Sample Audit - Drill down for items selected or randomly chosen	Performance Sampling - finding good and bad among the dross	What is Unusual? - finding what is different that may be early warning of problems or opportunities	Modelling Support - Building potentially useful models in advance of problem occurrences
The People Factor - What are they saying about our status and performance?	Whistle Blowers Forum - the "suggestion box"?	Forecasters Forum - What the subject experts are saying about the trends and unusual events	Collaboration - Finding the "expert" and sharing experiences

The operations available at each channel are illustrated in Fig. 2. For each channel, a series of examples are provided 50. The user is able to view the executive information system measures 51 and add or remove measures 52. For each measure 53, it is possible to perform various operations on the measure 54. The operations can then be added to the overall project 56 and the channel saved 57.

The pathfinder system is able to produce standard reports as illustrated in Fig. 3 with the report information being drawn from the various modules.

10 Further, this system includes the usual administrative overriding functions of standard Internet based applications such as adding users changing privileges etc.

The appendix to this specification contains a number of web page printouts for an example system constructed in accordance with the aforementioned design. The appendices have been included for illustrative purposes only and it would be obvious to

the skilled reader that many different forms of implementation are possible. The table below illustrates a concordance between the flow chart of Fig. 1 and the appendix. The system has been implemented utilising standard web authoring tools and includes the usual navigational facilities for traversing the flow chart.

Appendix	Flow Chart Stage
A	4
B	9
C	10
D	20
E	21
F	22
G	11
H	30
I	31
J	33
K	12
L	36
M	37
N	38
O	13
P	41
Q	42
R	43

- 5      The foregoing describes one form of the preferred embodiment. Modifications, obvious to those skilled in the art can be made thereto without departing from the scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. An executive information requirements specification system for utilisation in conjunction with the operations of an organisation, said system including:
  - 5 at least one of four independent interactive modules for interrogation by an executive, each of said modules storing information relevant to the organisation, the modules including:
    - (a) a first module eliciting and storing information requirements related to the operational status of the organisation;
    - 10 (b) a second module eliciting and storing information requirements about the relevant acceptability of the operational status of the organisation;
    - (c) a third module eliciting and storing information requirements derived from forecasting and exception analysis models of the organisation; and
    - (d) a fourth module eliciting and storing information and model requirements  
15 likely to be required should a problem be identified with the organisation.
2. A system as claimed in claim 1 wherein each of said modules includes a number of sub-modules storing information relevant to the module for interaction with by a user.
3. A system as claimed in claim 2 wherein said first module includes a series of submodules directed to at least one of organisation key performance indicators and  
20 customer feedback.

4. A system as claimed in claim 2 wherein said second module includes a series of submodules directed to at least one of many possible benchmarks that the organisation has sought to achieve, relative performance measurements and market feedback.
5. A system as claimed in claim 2 wherein said third module includes a series of submodules directed to significant changes in at least one of trends established in operational key time series, the validity of model assumptions made in forecasting and unexpected events in the marketplace.
6. A system as claimed in claim 2 wherein said fourth module includes a series of submodules directed to at least one of tools allowing for fast diagnosis of problems and to ensuring data availability for answering anticipated questions.
7. A system as claimed in claim 1 wherein said system is implemented via an internet browser environment.
8. A method of specifying executive information requirements in a useable form the method comprising the step of providing an interactive computer based system including a series of interactive modules , the modules including:
  - (a) a first module eliciting and storing information requirements related to the operational status of the organisation;
  - (b) a second module eliciting and storing information requirements about the relevant acceptability of the operational status of the organisation;
  - (c) a third module eliciting and storing information requirements derived from forecasting and exception analysis models of the organisation; and

(d) a fourth module eliciting and storing information and model requirements

likely to be required should a problem be identified with the organisation.

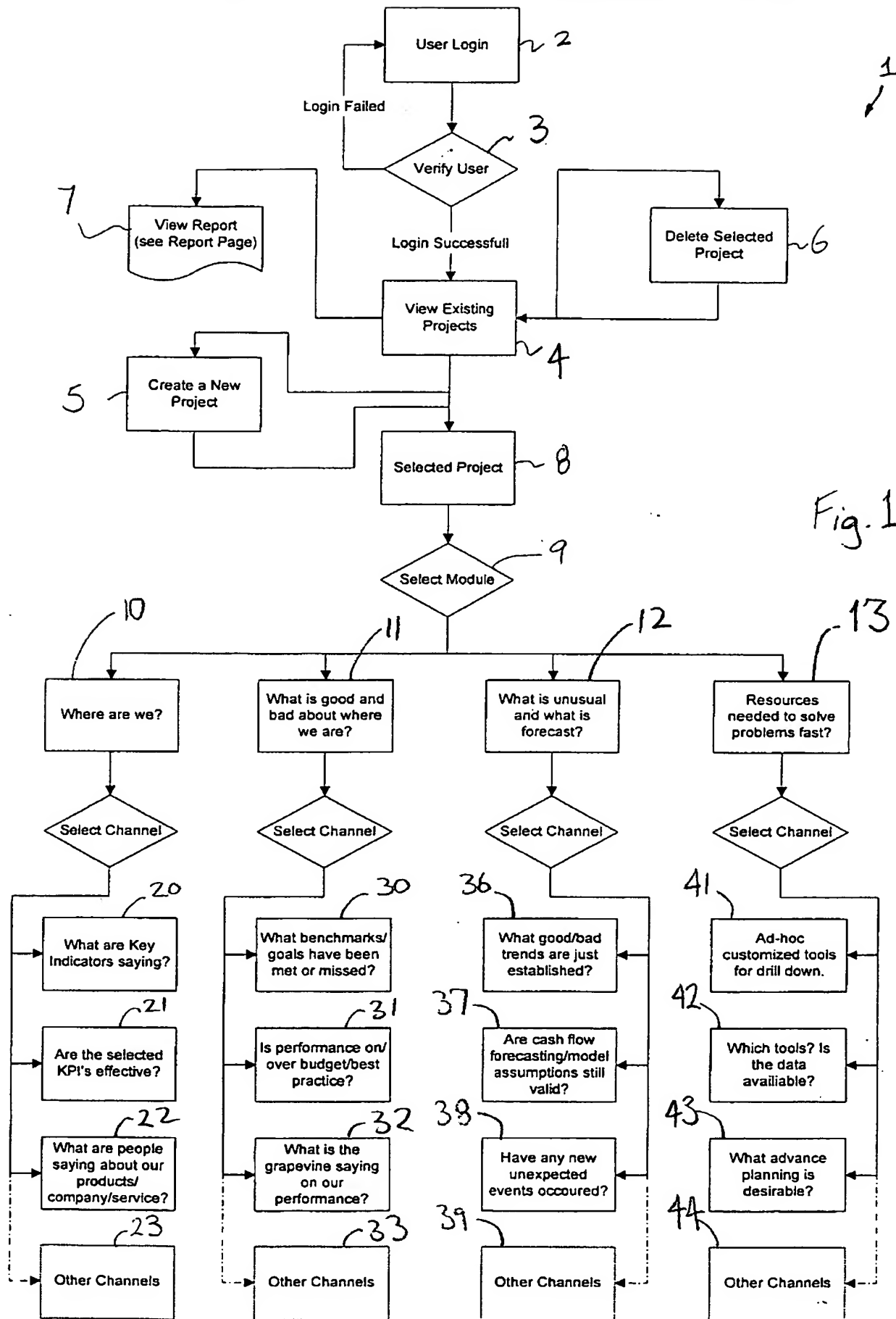
DATED this 20<sup>th</sup> Day of February 2003

BALDWIN SHELSTON WATERS

5 Attorneys for: EIS Pathfinder Pty Ltd

## ABSTRACT

An executive information requirements specification system for utilisation in conjunction with the operations of an organisation, the system including: at least one of four independent interactive modules for interrogation of, or self-analysis by, an  
5 executive, each of the modules eliciting and storing information requirements relevant to the organisation, the modules including: (a) a first module eliciting and storing information requirements related to the operational status of the organisation; (b) a second module eliciting and storing information requirements about the relevant acceptability of the operational status of the organisation; (c) a third module eliciting and  
10 storing information requirements derived from forecasting and exception analysis models of the organisation; and (d) a fourth module eliciting and storing information and model requirements likely to be required should a problem be identified with the organisation.



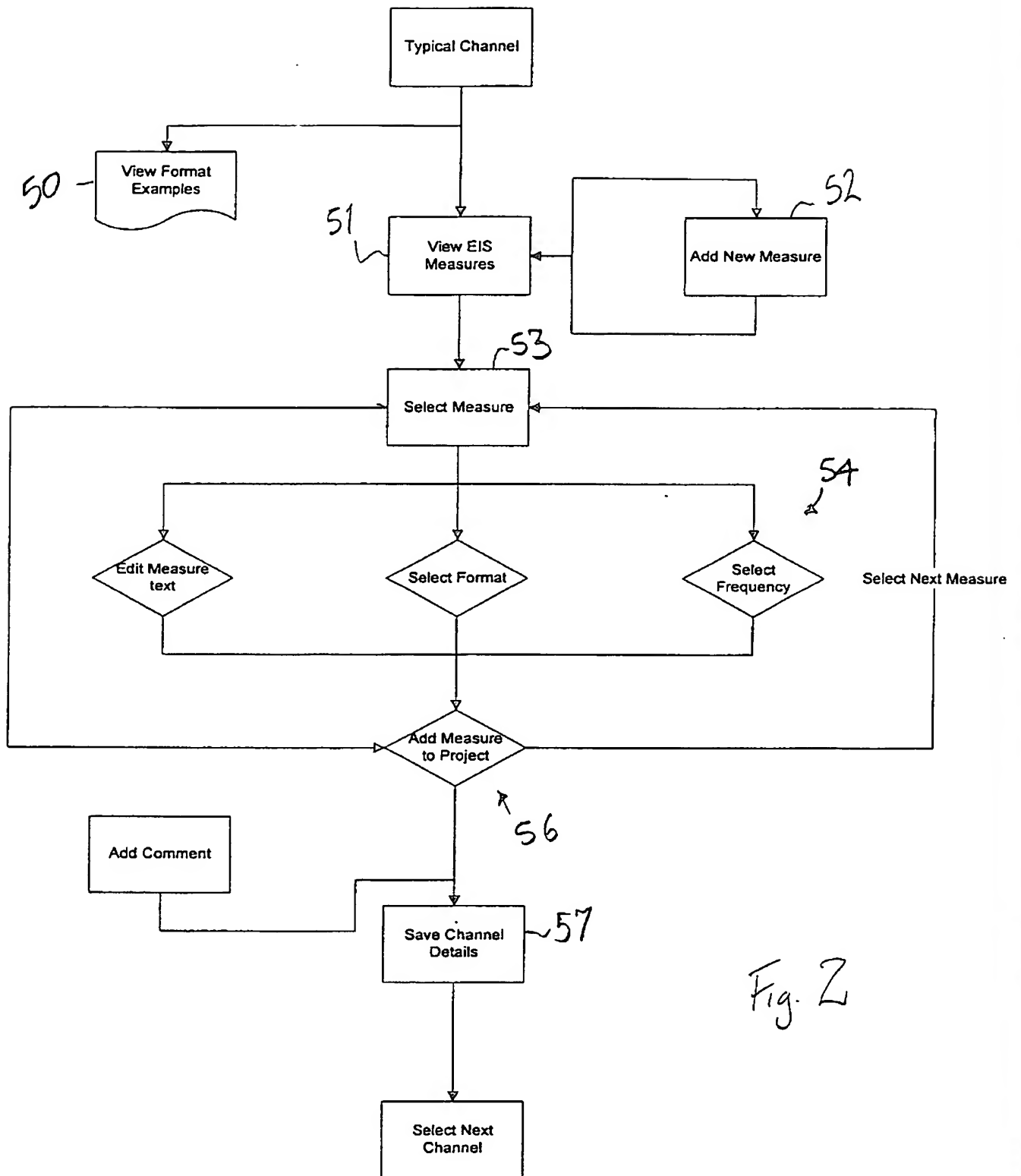


Fig. 2



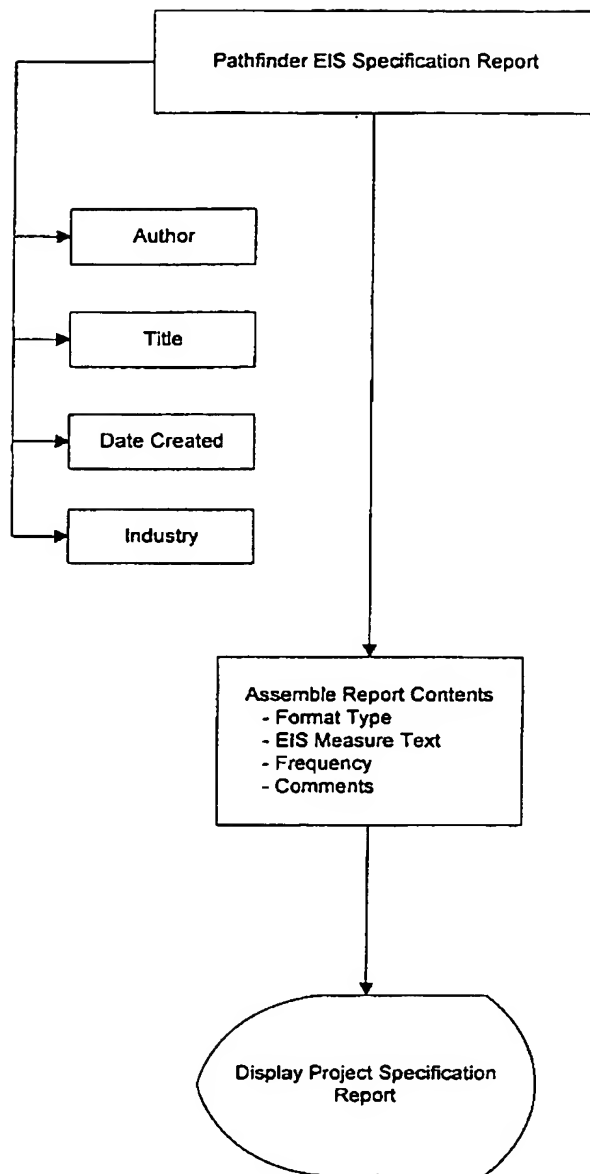


Fig. 3

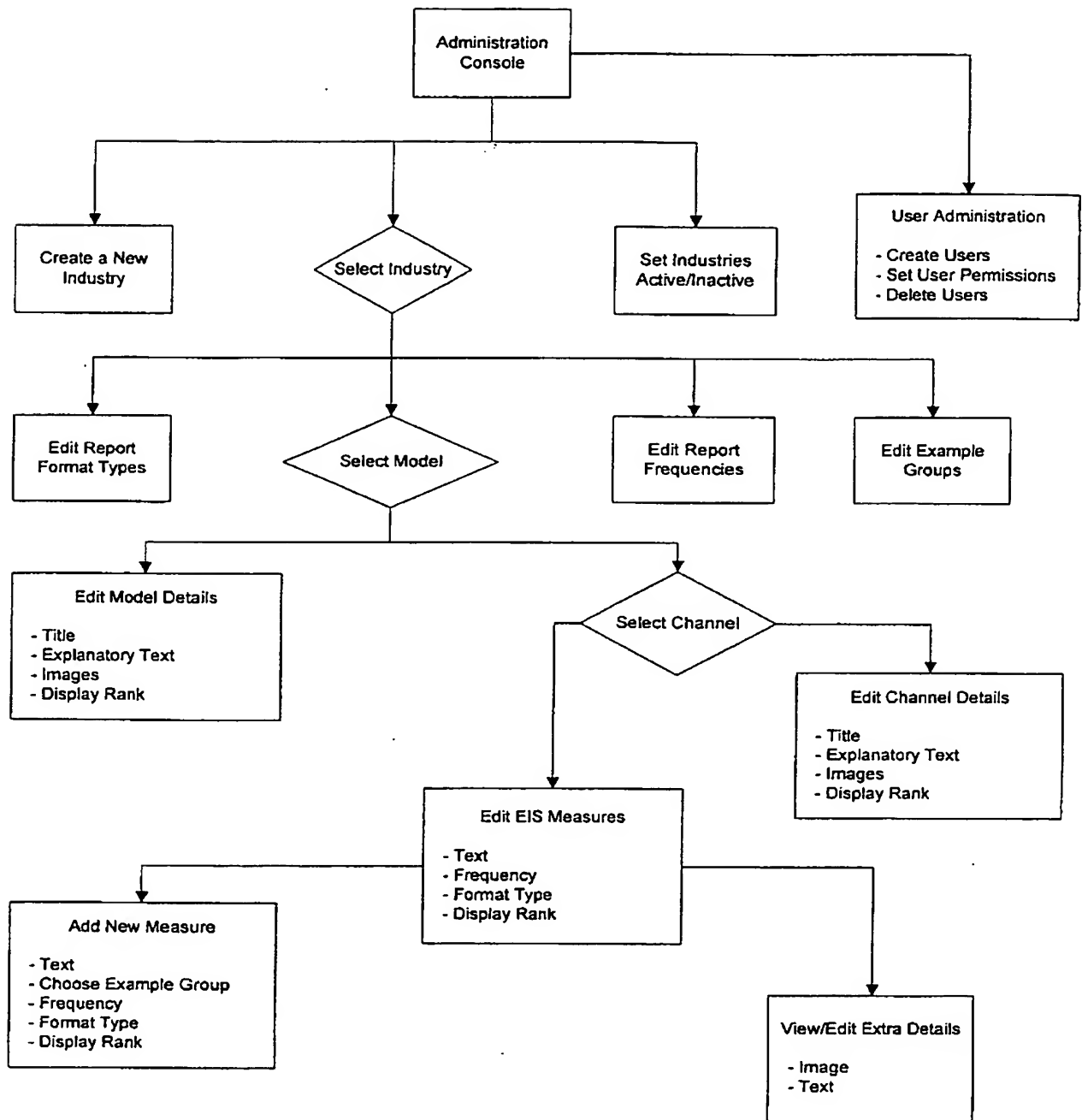


Fig. 4